



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 575 867 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
05.02.1997 Bulletin 1997/06

(51) Int. Cl.⁶: B65F 3/08, B65F 3/10

(21) Application number: 93109550.9

(22) Date of filing: 15.06.1993

(54) Bin hoist for lifting and tipping a bin

Hub-Kippvorrichtung zum Heben und Kippen eines Müllbehälters

Dispositif de levage-basculement d'une poubelle

(84) Designated Contracting States:
DE ES FR GB NL SE

(30) Priority: 22.06.1992 US 903078
23.11.1992 US 979153

(43) Date of publication of application:
29.12.1993 Bulletin 1993/52

(60) Divisional application: 96112007.8

(73) Proprietor: BAYNE MACHINE WORKS INC.
Simpsonville, South Carolina 29681 (US)

(72) Inventors:
• Bayne, Jimmy O.
Simpsonville, South Carolina (US)
• Susil, Michael J.
c/o Bayne Machine Works Inc.
Simpsonville, South Carolina 29681 (US)

(74) Representative: Harvey, David Gareth et al
Graham Watt & Co.
Riverhead
Sevenoaks Kent TN13 2BN (GB)

(56) References cited:
DE-B- 1 202 645 FR-A- 1 182 719
US-A- 4 057 156 US-A- 4 597 710
US-A- 4 773 812

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 575 867 B1

the rear of a body of the vehicle. Adjacent to the rear of the body, there is a hopper and the hoist can be used for lifting a bin 26 and discharging contents of the bin into the hopper. The particular bin represented in Figure 1 has a pair of vertically spaced, horizontal bars 30 and 32 with which the hoist can co-operate.

The hoist, which is shown more clearly in Figure 4, comprises a bin carrier 100 provided with alternative sets of holding means for holding bins of respective different kinds on the bin carrier. A first of the holding means comprises a lower clamp member 102 and an upper clamp member 104 between which there can be received the lip 52 of the bin 50 represented in Figure 3. The lower clamp 102 is fixed on the bin carrier 100 and the upper member 104 is connected with the bin carrier for pivoting relative thereto towards and away from the lower member 102 about a generally horizontal axis. Reference no. 106 identifies actuation means for moving the upper clamp member 104. This actuation means includes at least one linkage 108 linking the upper clamp member 104 with further components of the hoist which move during operation of the hoist.

The second of the holding means includes a lower member 110 mounted for pivotal movement relative to the bin carrier 100 between an extended position, which is represented by full lines in Figures 4 and 5, and a retracted position represented by a broken line in Figure 5. A spring is provided for urging the member 110 to the extended position and the member can be pushed to the retracted position by the bin 50, if that bin approaches the bin carrier 100.

The second holding means further comprises an upper member 116 which is also mounted for pivoting relative to the bin carrier 100 between an extended position represented by full lines in Figures 4 and 5 and a retracted position represented by a broken line. A spring is provided for urging the upper member 116 towards its extended position and this member can be pushed to its retracted position by the bin 50, if that bin approaches the bin carrier 100.

The second holding means 110, 116 is used for holding the bin 26 on the bin carrier 100, the holding means engaging the bars 30 and 32 of the bin, as represented in Figure 6B.

The bin 50 is shown in Figure 7A and the way in which the first holding means 102, 104 co-operates with the lip 52 of this bin is represented in Figure 7B.

The hoist further comprises a support 154 for the bin carrier 100. The support is guided by upright guides 162 and 164 for upward and downward movement relative to the body of the vehicle 22 and lifting means comprising an hydraulic cylinder 172 is provided for raising the support 154 and the bin carrier 100 relative to the guides 162 and 164. The support 154 may include a support frame 178 which comprises a pair of generally vertical support elements 180 and 182 with rollers 184 carried on the support elements to run in the vertical guides 162 and 164.

For tipping the bin carrier 100 relative to the support

154, there is provided tipping means 166 which includes an hydraulically actuated rotary motor having a transverse output shaft 186 with respective ends 188 and 190. A pair of torque arms 192 and 194 are received on and fixed with respect to the end portions of the output shaft. The opposite ends of the torque arms are pivotally connected with the bin carrier 100 at points 196 and 198 adjacent to a base 200 of the bin carrier. Bolts 202 provide respective bearings 204 for each of the torque arms.

10 15 A pair of idler arms 206 and 208 is pivotally connected adjacent to respective first ends thereof on the support frame 178 and adjacent to second ends thereof on the bin carrier 100. The respective pivot axes 210 and 212 about which the idler arms pivot relative to the support 154 and the bin carrier 100 are spaced considerably from the base portion 200 of the bin carrier and are offset from the attachment points 196 and 198 of the torque arms 192 and 194.

20 25 The linkage 108 acts between the upper clamp member 104 and one of the arms 192, 194, 206 and 208. The length of the linkage 108 may be adjustable to vary the action of the upper clamp 104.

Figure 11 shows in more detail an example of a 30 suitable linkage, connecting arms 216 and 218 to torque arms 192 and 194 respectively. It will be understood that alternatively the linkage may be connected with the idler arms 206 and 208.

35 The hoist further comprises a bin rest 226 mounted for reciprocation relative to the bin carrier 100 between an extended position and a retracted position relative to a lower margin of the bin carrier. On the bin rest, there is a roller 248 for bearing against the bin 50 when the bin is lifted from the ground by the holding means 102, 104. A pair of links 228 and 230 are connected between the bin rest 226 and the support 154, for example a frame 178 of the support. The links 228 and 230 are free to pivot relative to the bin rest and the support.

40 45 Channels 232 and 234 are provided on the bin carrier 100 at the face thereof which faces forwards with respect to the vehicle, when the bin carrier is in the lowered position. The bin rest 226 includes a plate having opposite marginal portions which are received in the slide channels 232 and 234.

The lower member 110 of the second holding means is carried on the bin rest 226 for reciprocation therewith relative to the bin carrier 100.

50 55 Tipping means 166 for tipping the bin carrier 100 relative to the support 154 is shown in Figure 13. Suitable tipping means is disclosed in US-4,773,812. The tipping means comprises an hydraulic piston and cylinder unit with a rack incorporated in or mounted on a piston rod of this unit and a pinion mounted on the output shaft 186 of the tipping means. Respective teeth of the rack and pinion are mutually meshed inside the cylinder of the piston and cylinder unit, where they are lubricated by the hydraulic fluid supplied to the cylinder.

The piston and cylinder unit of the tipping means 166 are incorporated in the hydraulic circuit represented

passage thereof. This central passage contains the movable insert 416 which is a sliding fit inside the fixed insert. The movable insert has a flange at one of its ends which engages with the fixed insert to limit travel of the movable insert in a direction towards the piston.

The movable insert 416 also has an annular relief 466 around the outside of the movable insert and adjacent to the second fluid flow path holes 420. Fluid can flow around the outside of the movable insert 416 whenever this insert is in the second position, represented in Figure 26, so that fluid passes through the bore 414, the holes 464, the relief 466 and through the bore 420. The diameter of the bore 420 is typically 0.75mm. In contrast, the holes 418 may have a diameter of up to 4mm. Preferably, there is a plurality of holes 418, there is a plurality of holes 418, for example four. The number of holes 420 is smaller. There may be one or two of these holes.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or compositions, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A bin hoist comprising a bin carrier (100), holding means (102, 104), on the bin carrier for holding a bin (50) on the carrier, a support (154) for the bin carrier and tipping means (166) for tipping the bin carrier relative to the support, wherein the tipping means includes an hydraulic motor and means (408) for restricting the flow of hydraulic fluid to or from the motor as the bin carrier approaches an end of its travel in a tipped attitude, wherein the hydraulic motor comprises a piston and cylinder unit, characterised in that there is in one end of the cylinder of said unit, a passage containing a fixed, hollow insert (450), a slidable insert (416) which lies inside the fixed insert and defines alternative flow paths for hydraulic fluid into or from the cylinder, said flow paths having respective different resistances to flow of hydraulic fluid, a spring (422) provided for biasing the slidable insert towards the interior of the cylinder and wherein the piston is engageable with the slidable insert to displace the slidable insert relative to the fixed insert and thereby change the path of hydraulic fluid into or from the cylinder as the piston approaches one end of its stroke.
2. A bin hoist according to Claim 1 wherein the hydraulic motor further comprises an output shaft (186) which is rotatable relative to the cylinder of said unit, a rack and a pinion, the rack (262) being
3. A bin hoist according to Claim 1 or Claim 2 wherein the slidable insert includes a plurality of holes defining a first flow path thereof, the slidable insert further including at least one hole (418) defining a second flow path thereof, and wherein there is at the outside of the slidable insert, and adjacent to the second flow path hole, an annular passage (466).
4. A bin hoist according to Claim 3 wherein the plurality of holes included in the slidable insert defining a first flow path thereof have different sized bores to the at least one hole (418) defining a second flow path thereof.
5. A bin hoist according to any one of the preceding claims wherein there is at the outside of the fixed insert (450) an annular passage (462), a plurality of holes (464) formed through the fixed insert from the passage at the outside thereof to the passage containing the slidable insert (416).
6. A bin hoist according to any one of the preceding claims wherein the slidable insert (416) includes a central passage and the or a lateral hole (418) communicating between the outside of the slidable insert and the central passage thereof.
7. A bin hoist according to any one of the preceding claims wherein the slidable insert (416) has means for limiting travel of the slidable insert relative to the cylinder in a direction towards the piston.
8. A bin hoist according to any of the preceding claims comprising at least one pair of arms (192, 216, 206, 194, 218, 208), each arm being connected between the support and the bin carrier and arranged for pivoting relative to both the support and the bin carrier about respective mutually parallel axes when the tipping means tips the bin carrier relative to the support between a lowered position and a raised position, and wherein, when the bin carrier is in the lowered position, the axis about which one of said arms pivots relative to the bin carrier is offset from a plane containing at least two other of said axes in a direction from the support towards the holding means.
9. A bin hoist according to Claim 8 wherein one arm (216, 218) of the or each pair of arms is substantially shorter than is the other arm of the pair.
10. A bin hoist according to any one of the preceding

incorporated in or carried on a piston rod of said unit, the pinion being carried on or incorporated in the output shaft (116) and the rack and pinion having respective teeth (260) which are enmeshed with each other within the cylinder of said unit.

und bei der dann, wenn sich der Behälterträger in der abgesenkten Position befindet, die Achse, um die einer der besagten Arme relativ zu dem Behälterträger schwenkt, außerhalb einer Ebene, die wenigstens zwei andere dieser Achsen enthält, in einer Richtung von der Halterungsstütze in Richtung auf die Halteeinrichtungen liegt.

9. Eine Hub-Kippvorrichtung nach Anspruch 8, bei der ein Arm (216, 218) des Paares der Arme oder jedes Paares der Arme wesentlich kürzer ist als es der andere Arm des Paares ist. 10

10. Eine Hub-Kippvorrichtung nach einem der vorhergehenden Ansprüche, bei der der Behälterträger eine Behälterauflage (226) enthält, die für eine Bewegung relativ zu dem Behälterträger zwischen einer ausgestreckten Position und einer zurückgezogenen Position ausgelegt ist, wobei die Bewegung der Behälterauflage relativ zu dem Behälterträger von der ausgestreckten Position zu der zurückgezogenen Position eine Bewegung nach oben ist, wenn sich der Behälterträger in einer abgesenkten Position befindet. 15

11. Eine Hub-Kippvorrichtung nach Anspruch 10, die außerdem eine Einrichtung zum Ausstrecken der Behälterauflage (226), wenn der Behälterträger relativ zu der Halterungsstütze gekippt ist, umfaßt. 20

12. Ein Hub-Kippvorrichtung nach Anspruch 11, bei der die Einrichtung zum Ausstrecken ein Verbindungsglied enthält, das sowohl mit der Behälterauflage als auch mit der Halterungsstütze verbunden ist. 25

Revendications

1. Dispositif de hissage de poubelle comprenant un porteur de poubelle (100), des moyens de soutien (102, 104) situés sur le porteur de poubelle pour soutenir une poubelle (50) sur le porteur, un support (154) destiné au porteur de poubelle et un moyen de basculement (166) pour basculer le porteur de poubelle par rapport au support, dans lequel le moyen de basculement comprend un moteur hydraulique et un moyen (408) pour restreindre l'écoulement de fluide hydraulique allant vers le moteur ou provenant de celui-ci lorsque le porteur de poubelle s'approche d'une extrémité de son parcours en situation basculée, dans lequel le moteur hydraulique comprend un ensemble de piston et cylindre, caractérisé en ce qu'il existe à l'une des extrémités du cylindre dudit ensemble un passage contenant une pièce encastrée fixe (450), une pièce encastrée coulissante (416) laquelle se trouve à l'intérieur de la pièce encastrée fixe et définit des voies d'écoulement alternées pour le fluide hydraulique entrant dans le cylindre ou en sortant, les dites voies d'écoulement comportant des élé- 40

ments différents correspondants de résistance à l'écoulement du fluide hydraulique, un ressort (422) prévu pour solliciter la pièce encastrée coulissante vers l'intérieur du cylindre et dans lequel le piston peut s'introduire dans la pièce encastrée coulissante pour déplacer la pièce encastrée coulissante par rapport à la pièce encastrée fixe et modifier ainsi la voie d'écoulement du fluide hydraulique entrant dans le cylindre ou en sortant lorsque le piston s'approche de l'une des extrémités de sa course.

2. Dispositif de hissage de poubelle selon la revendication 1, dans lequel le moteur hydraulique comprend en outre un arbre de sortie (186), lequel peut tourner par rapport au cylindre dudit ensemble, une crémaillère et un pignon, la crémaillère (262) étant incorporée dans la tige de piston dudit ensemble ou portée par celle-ci, le pignon étant porté sur l'arbre de sortie (116) ou incorporé dans celui-ci et la crémaillère et le pignon comportant des dents correspondantes (260) qui sont engrenées les unes avec les autres à l'intérieur du cylindre dudit ensemble. 20

3. Dispositif du hissage de poubelle selon la revendication 1 ou la revendication 2, dans lequel la pièce encastrée coulissante comprend une pluralité de perçage définissant une première voie d'écoulement, la pièce encastrée coulissante comprenant en outre au moins un perçage (418) définissant sa seconde voie d'écoulement, et dans lequel il existe à l'extérieur de la pièce encastrée coulissante un passage annulaire (466) adjacent au second perçage de voie d'écoulement. 25

4. Dispositif de hissage de poubelle selon la revendication 3, dans lequel la pluralité de perçages présents dans la pièce encastrée coulissante définissant une première voie d'écoulement dans celle-ci comportent différents alésages dimensionnés à au moins l'un des perçages (418) définissant une seconde voie d'écoulement dans celle-ci. 30

5. Dispositif de hissage de poubelle selon l'une quelconque des revendications précédentes, dans lequel il existe à l'extérieur de la pièce encastrée fixe (450) un passage annulaire (462), une pluralité de perçages (464) traversant la pièce encastrée fixe depuis le passage à l'extérieur de celle-ci jusqu'au passage contenant la pièce encastrée coulissante (416). 35

6. Dispositif de hissage de poubelle selon l'une quelconque des revendications précédentes, dans lequel la pièce encastrée coulissante (416) comprend un passage central et le perçage ou un perçage latéral (418) établit une communication entre l'extérieur de la pièce encastrée coulissante et le passage central de celle-ci. 40

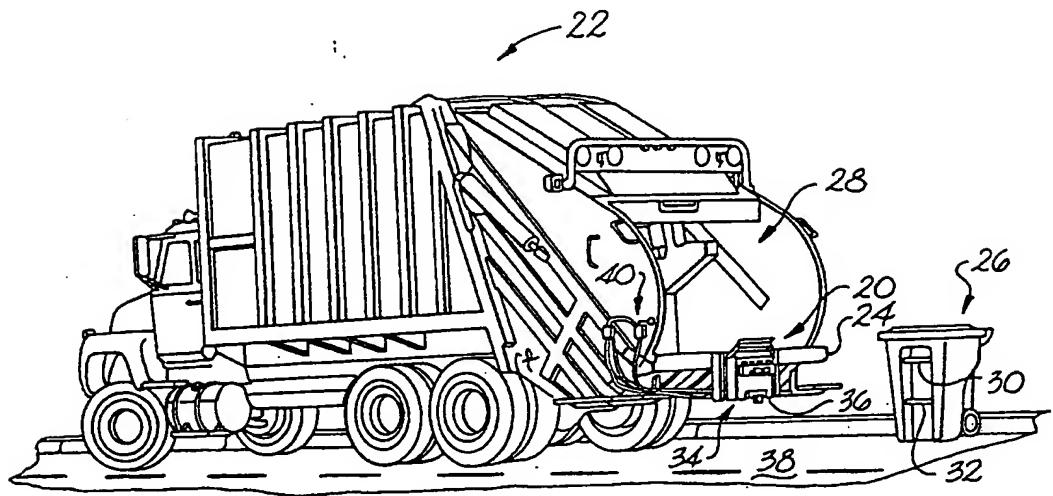


Fig. 1

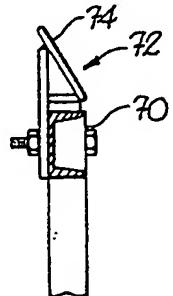


Fig. 2B

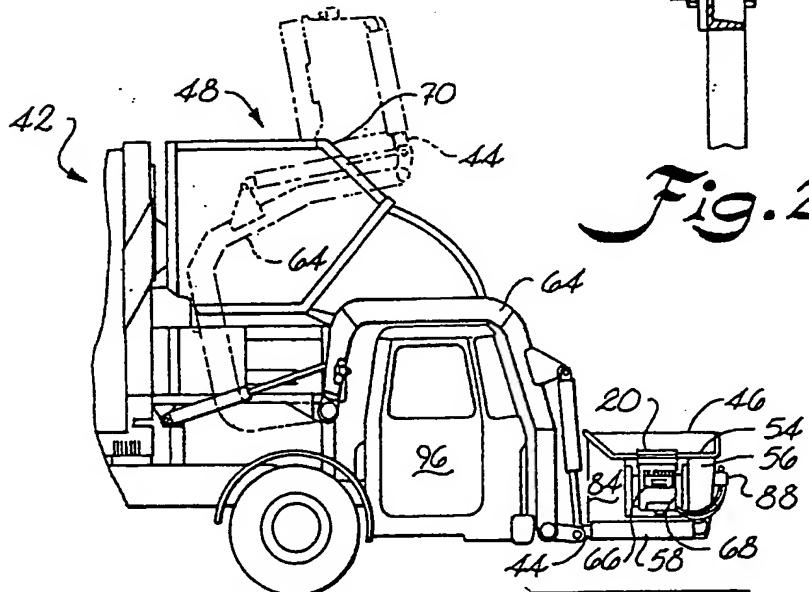


Fig. 2A

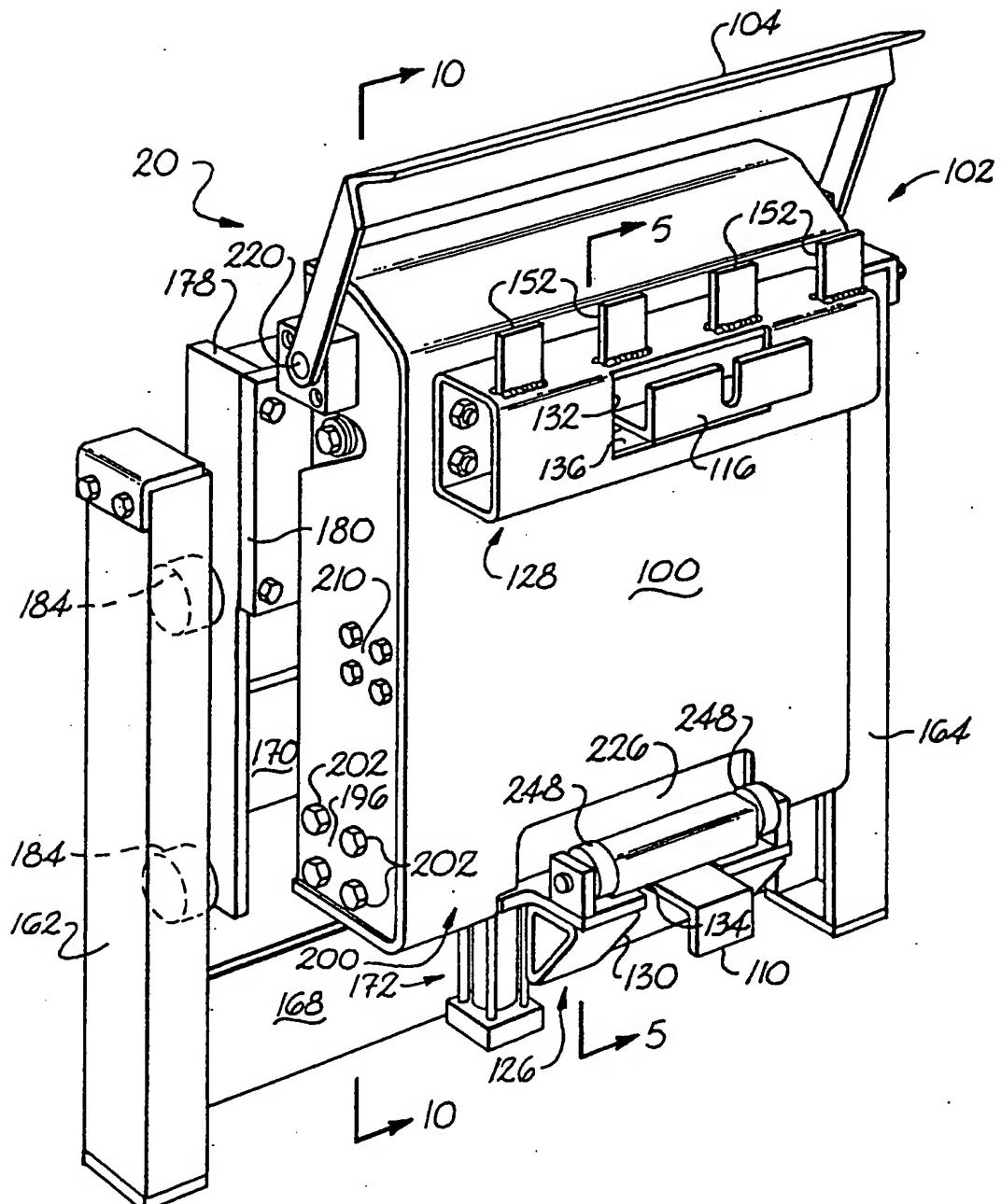


Fig. 4

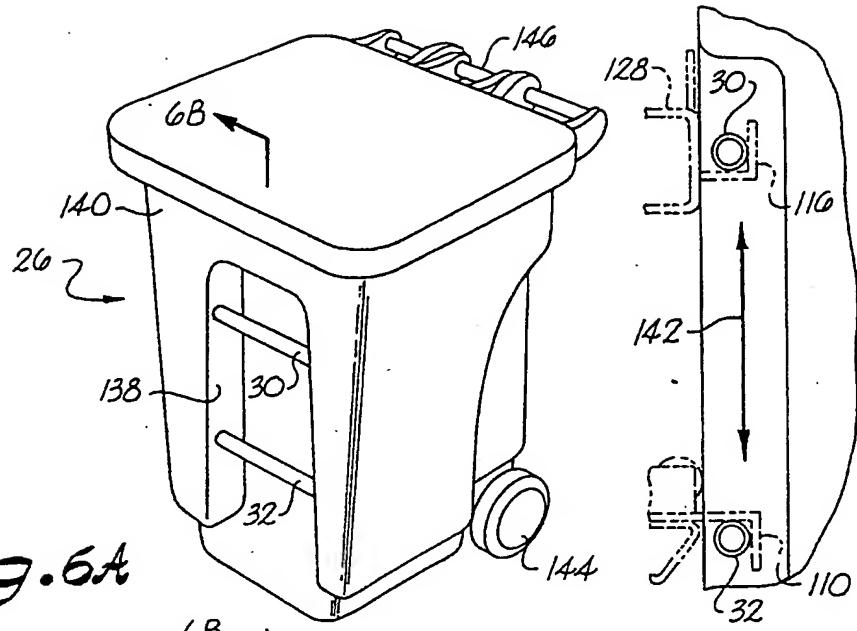


Fig. 6A

Fig. 6B

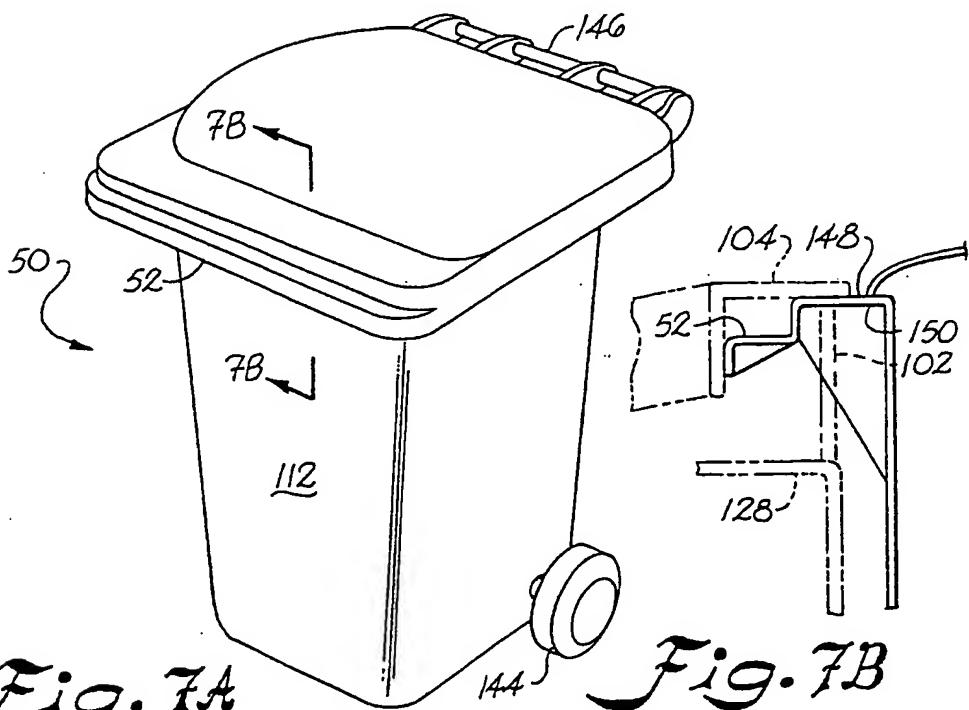


Fig. 7A

Fig. 7B

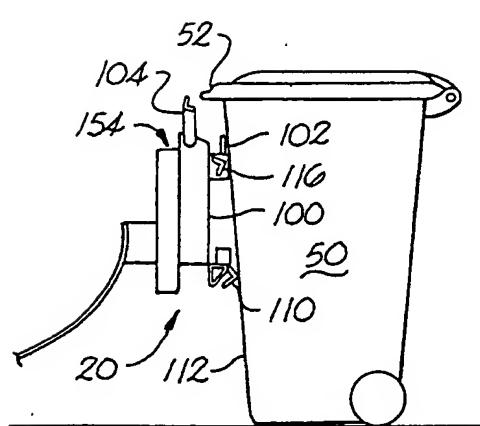


Fig. 9A

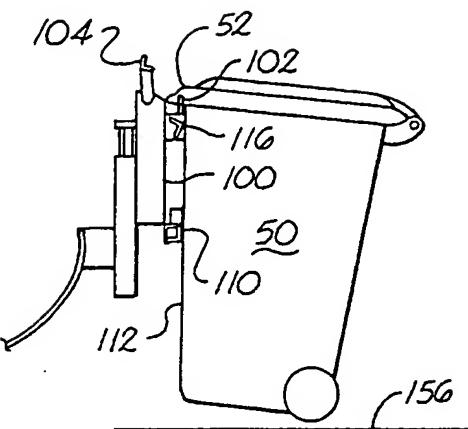


Fig. 9B

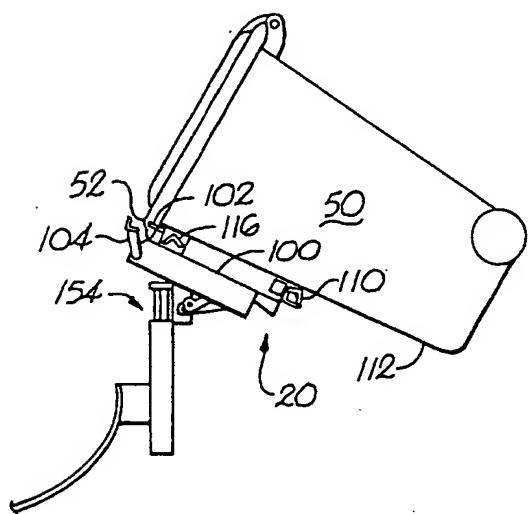


Fig. 9C

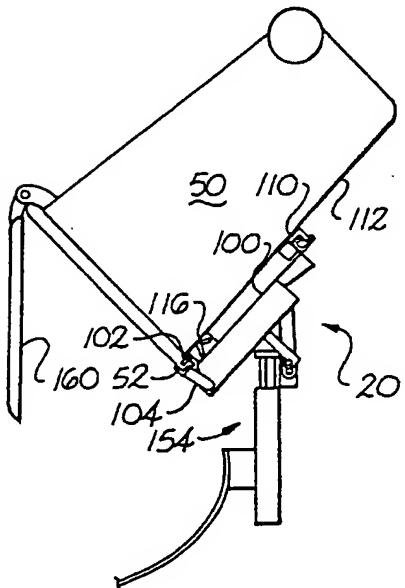


Fig. 9D

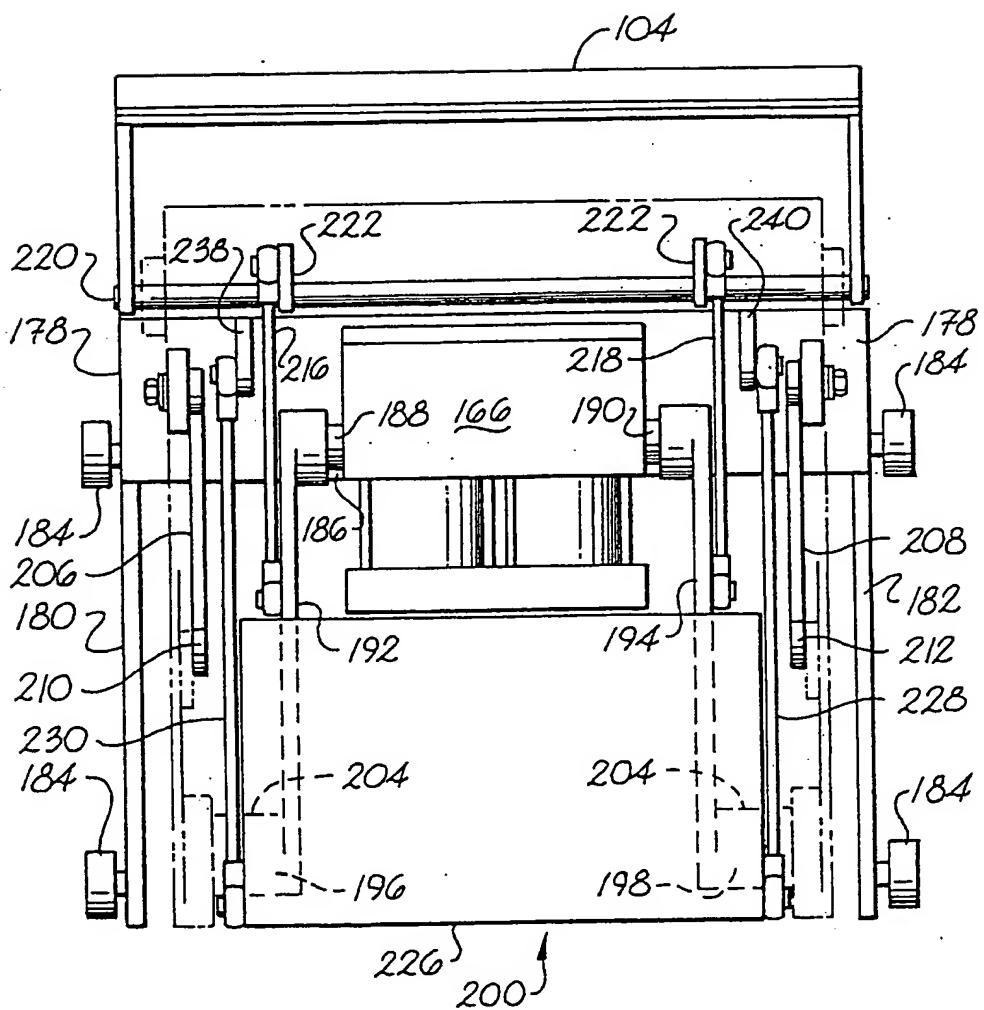


Fig. 11

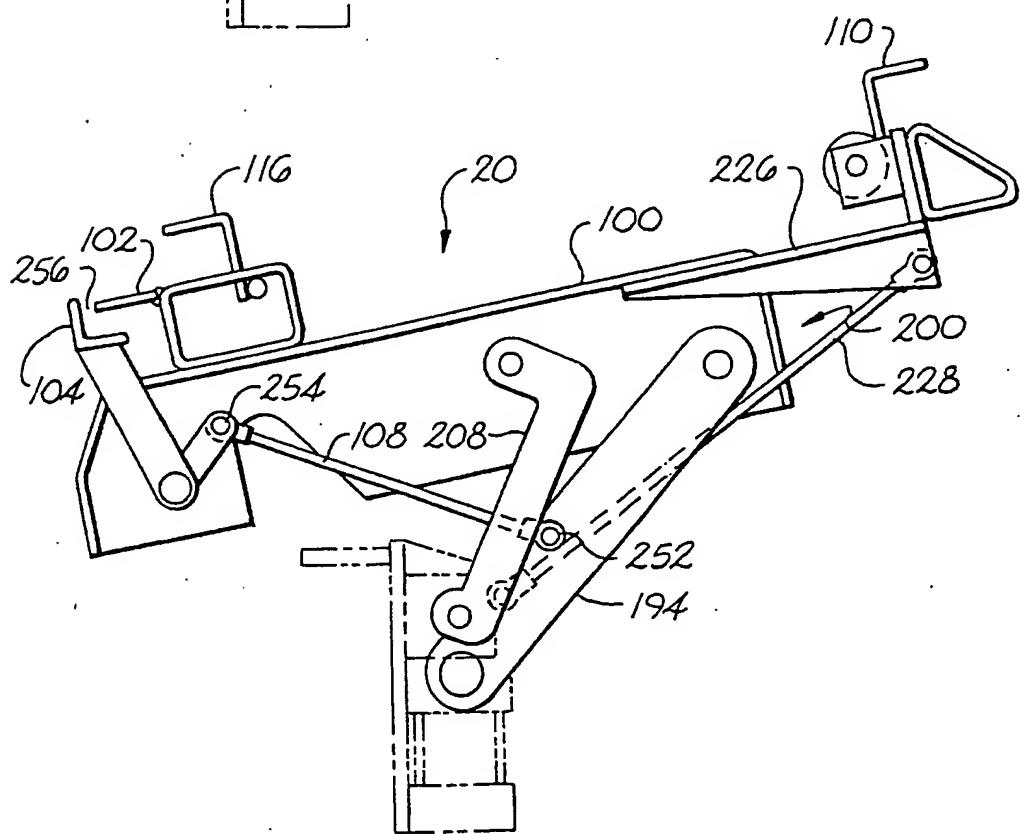
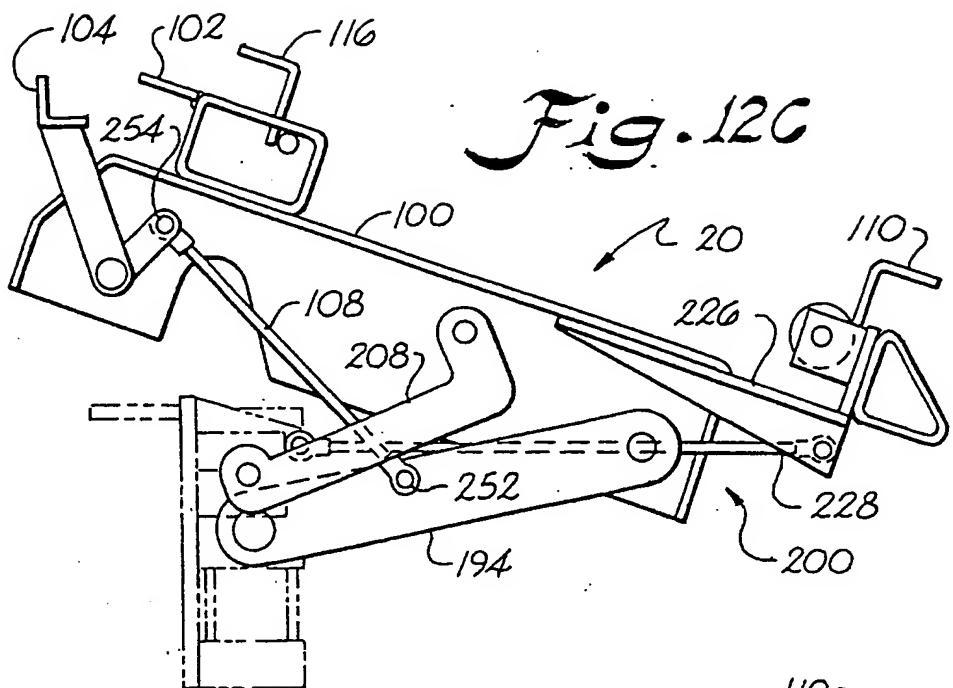


Fig. 12D

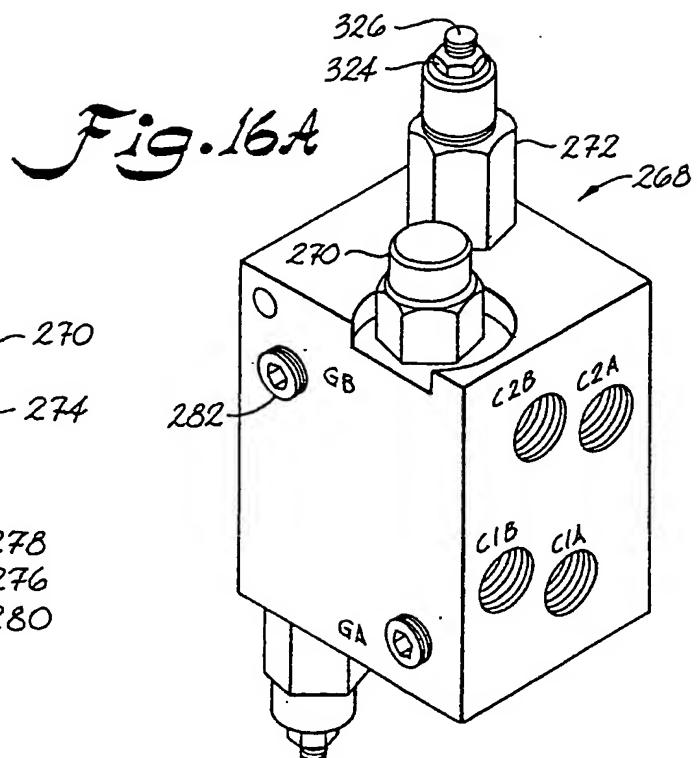


Fig. 17

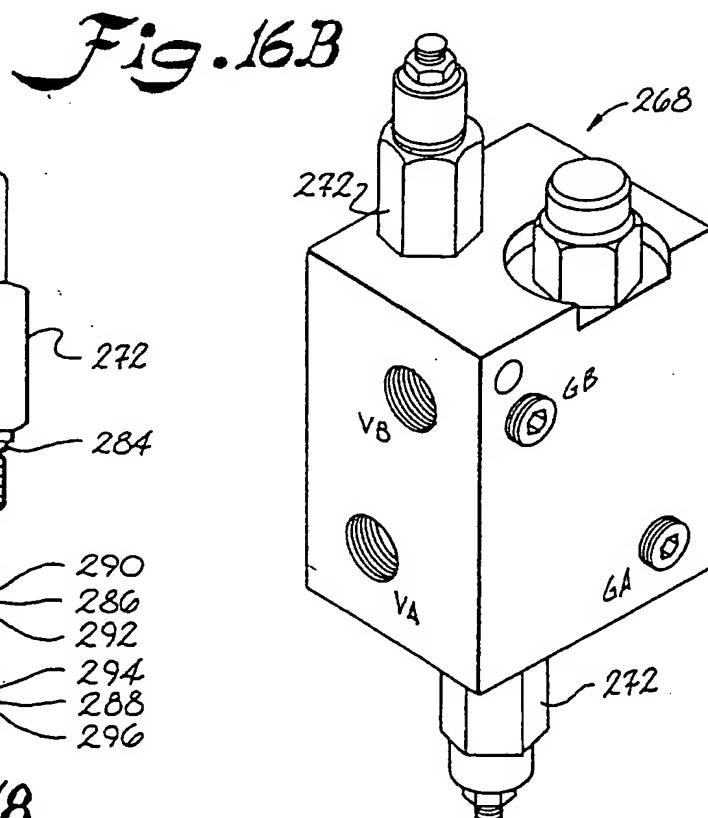
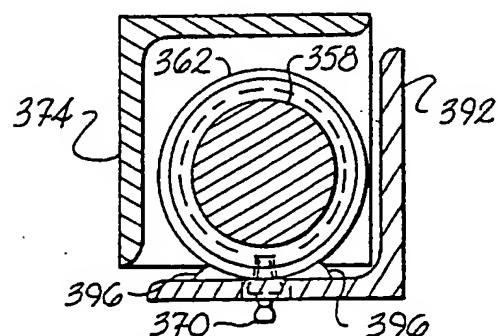
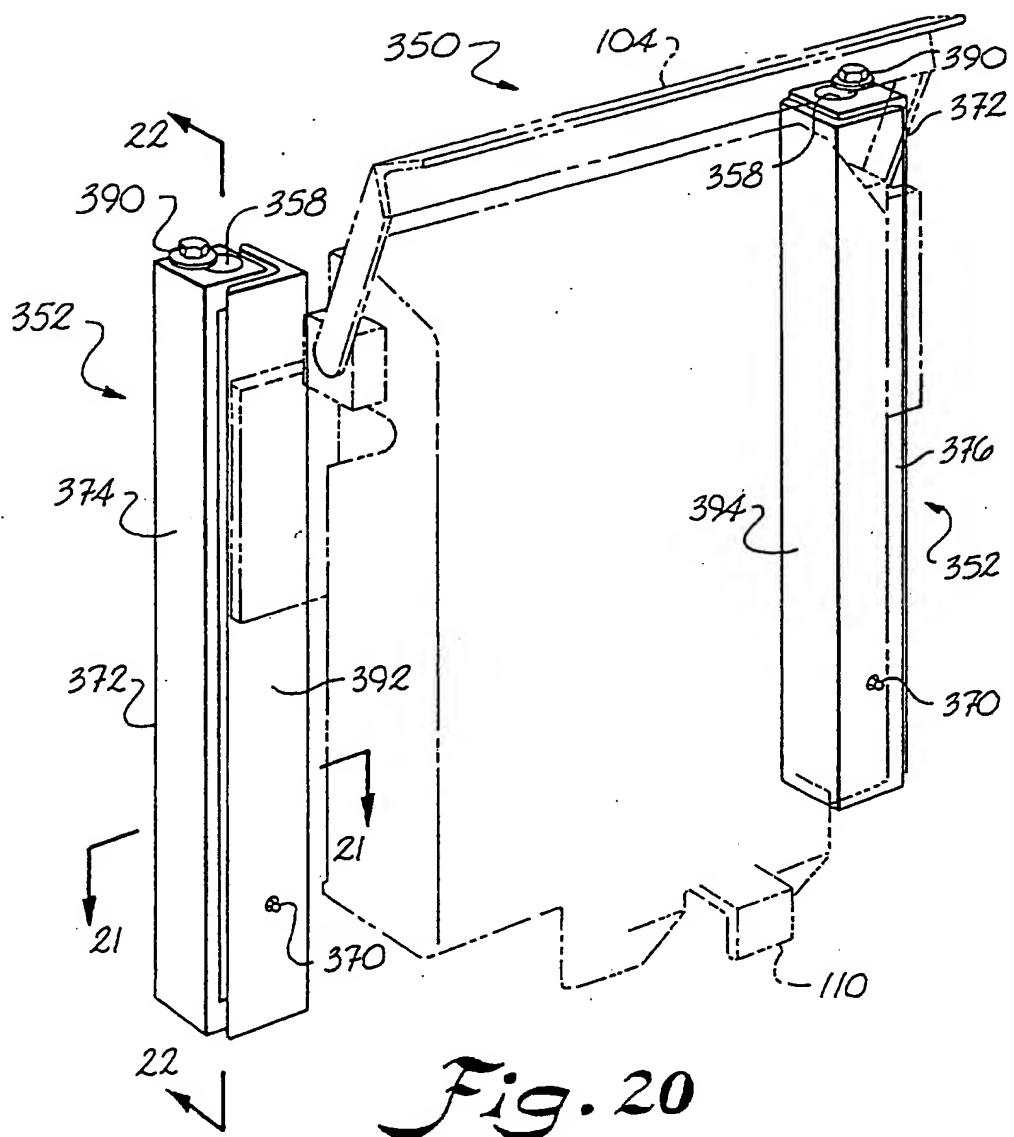


Fig. 18



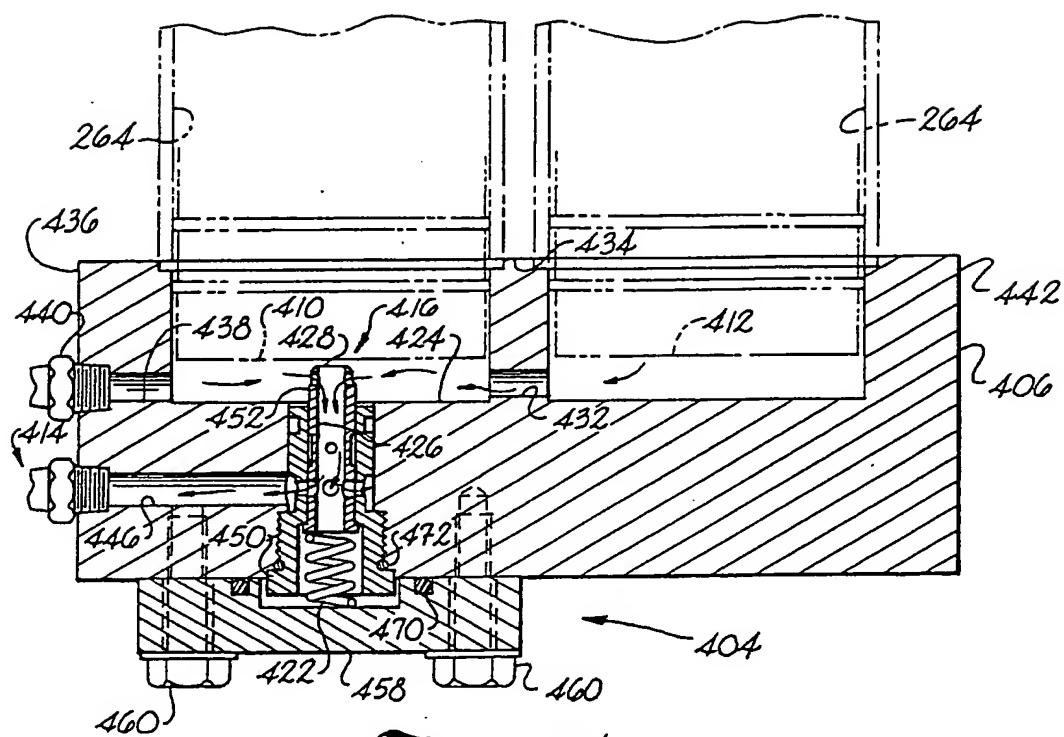


Fig. 24

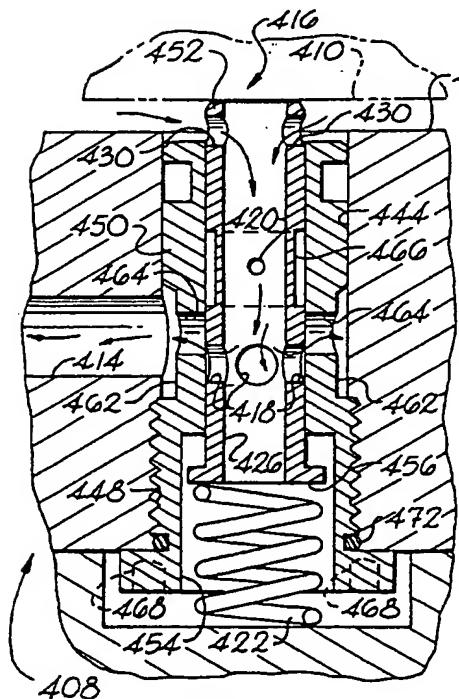


Fig. 25

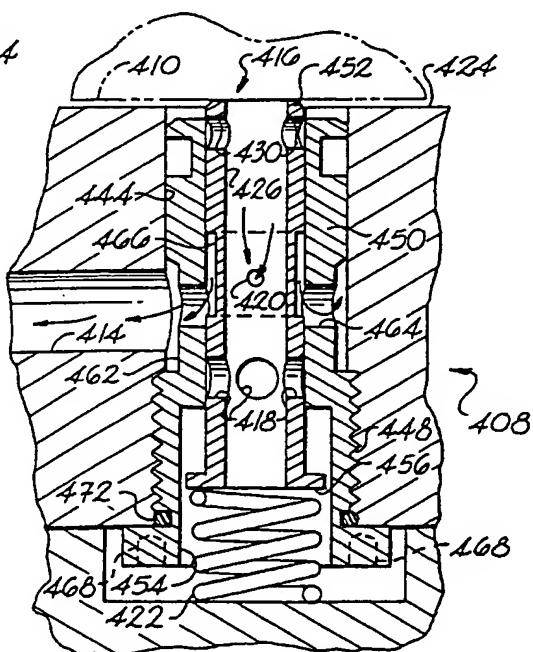


Fig. 26